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ANALYTICAL APPROXIMATIONS

Volume 19

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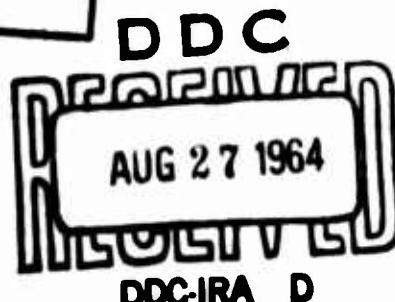
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10-26-54

Analytical Approximation

Chi-Square Integral: To better than .0007
over $0 \leq x \leq 4$ for $m = 6$,

$$F_m(x) = \frac{1}{2\Gamma(\frac{m}{2})} \int_0^x \left(\frac{t}{2}\right)^{\frac{m-1}{2}} e^{-\frac{t}{2}} dt$$

$$\approx .01857x^3 - .00516x^4 + .0004451x^5.$$

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11-8-54

Analytical Approximation

Chi-Square Integral: To better than .0006 over
 $0 \leq x \leq \infty$ for $m = 10$,

$$F_m(m-2+x) = \frac{1}{2\Gamma(\frac{m}{2})} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\approx 1 - \frac{.6289}{[1 + .03952x + .00327x^2 + .0001208x^3]^4}$$

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11-9-54

Analytical Approximation

Chi-Square Integral: To better than .0006 over
0 ≤ x ≤ ∞ for m = 9,

$$F_m(m-2+x) = \frac{1}{2\Gamma(\frac{m}{2})} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$
$$\doteq 1 - \frac{.6371}{[1+.04157x+.003616x^2+.0001279x^3]^4}.$$

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Analytical Approximation

Chi-Square Integral: To better than .0007 over
 $0 \leq x \leq \infty$ for $m = 8$,

$$F_m(m-2+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$= 1 - \frac{.6472}{\left[1 + .04402x + .004047x^2 + .000135x^3\right]^4}.$$

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11-11-54

Analytical Approximation

Chi-Square Integral: To better than .0007 over
 $0 \leq x \leq \infty$ for $m = 7$,

$$F_m(m-2+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\approx 1 - \frac{.6600}{\left[1 + .04707x + .004591x^2 + .0001414x^3\right]}.$$

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